Amendments to the specification

Paragraphs [0009], [00023], [00031], [00035], [00057], [00068], [00070], [00078], [00079], [00080], [00083], [00095], and [00096] of the disclosure were amended as follows, to correct objections raised by the Examiner.

Applicants acknowledge Examiner's remark concerning part numbers 40 and 46, each introduced in Paragraph [00078] to describe two different entities. Applicants amended the Drawings and the Disclosure, assigning a new part number, 40′, to the entity 'Downstream Data Interface' formerly numbered as 40, and assigning a new part number, 46′, to the entity 'Downstream Transmitter' formerly numbered as 46. Applicants replaced the part numbers with their respective new part numbers in the relevant locations in the disclosure. No new matter is introduced by this amendment.

The amended paragraphs are as follows:

[0009] As multiple network units, such as ONUs or ONTs share the same media, the OLT controls upstream transmission, by assigning upstream timeslots by implementing a Media Access Control (MAC) scheme. According to the ITU-T Recommendation G.983.4 upstream bandwidth may assigned in two manners - (a) in response to the utilization of upstream bandwidth by each of the ONUs, and (b) in response to upstream status reports from the ONUs or ONTs. More specifically, each ONU (or ONT) can include at least one Transmission Container (T-CONT), each T-CONT has at least one queue. An ONU reports the queue length of T-CONTs that belong to ~~him~~ it. Usually, a single T-CONT has more than a single queue, each queue associated with a distinct class of service. Accordingly, the aggregate queues length of that TCONT is reported.

[00023] The size of the IP packet is smaller ~~then~~ than the aggregate size of ATM cells the originate from the IP packet, as a header of 7 bytes is added to each 48 bytes of IP packet. Assuming that the size of the IP network is S1 = A * 48 + B, then the aggregate size of the ATM cells that originate from the IP packet (S2) equals: S2 = 53*(trunc {S1/ 48 byte} + 1)=53*(A+1). It is noted that the (A+1)'th ATM cell includes B bytes originating from the IP packet and (48 - B) "stuffing" bytes. The utilization of the ATM network equals S2/S1. S1 is also referred to as the length of the relevant payload and (S2-S 1) is also referred to as the overhead signals. ATM network arbitration and scheduling schemes are based upon the overall aggregate size

of ATM cells (including header and stuffing bit) that are stored within queues, and not according to the aggregate "net" payload of the cells and neither upon the length of each group.

[00031] According to an aspect of the invention the optical communication network is a passive optical network, the headend is an OLT and the network units are ONTs and/or ONUs but can also be T-CONTs. A single ONT or a single ONU can include a variety of T-CONTs. Conveniently, the communication network is ITU-T Recommendation G.983.4 compliant, and includes a segmentation ~~are~~ reassembly units for converting IP packets to groups of ATM cells. Preferably, a group of ATM cells originate from a single IP packet, and the grouping information reflects the length of the IP packet.

[00035] The invention provides a system wherein the media access controller is operable to determine an amount of grouping information to be sent from a network unit. The determination may be ~~is~~ responsive to grouping information previously transmitted from the network unit and to a data threshold, but can also be responsive to an estimation of grouping information relating to information that is yet to be sent upstream from the network units. The data threshold conveniently reflects a maximal amount of data that can be upstream transmitted from the network unit to the headend during a predefined time period. Conveniently, the predefined time period equals a MAC cycle, of an upstream frame period.

[00057] Reference is made to Figure lA, which is a schematic illustration of a network unit NU 8, in accordance with an embodiment of the invention. Network unit 8 can be an ONU or an ~~OLY~~OLT but this is not necessarily so.

[00068] It is noted that grouping information grants may further include timing information for determining the timing of upstream transmission (which slot ~~ans~~ and within that slot), as a plurality of NUs may transmit their grouping information during a single timeslot. The extracted data grants are provided to upstream assembler and transmitter 28 that in response triggers a provision of a group of ATM cells from a queue to the passive optical network, during the at least one consecutive selected timeslot.

[00070] NU 9 includes a classifier 13 that has a first input 11 for receiving variable size packets such as IP packets, a marking unit 17 and a policing unit 15 located

between the classifier ~~11~~ 13 and the marking unit 17. Marking unit 17 is coupled to packet distributor 19 for providing IP packets, and is coupled to grouping information database 30 for providing grouping information. Classifier 11 analyzes the incoming IP packets to determine to which class of service they belong.

[00078] OLT 38 includes (i) downstream data interface 40′, (ii) grant controller 48, (iii) downstream transmitter 46′, (iv) grant allocator 49, (v) upstream receiver 54, and (vi) grant queues GQI - GQ4 40 - 46.

[00079] Downstream data interface 40′ and grant allocator 49 are coupled to downstream transmitter 46′. Grant controller 48 is coupled to upstream receiver 54 and to grant queues GQI GQ4 40 - 46. Grant queues GQI- GQ4 40 - 46 are coupled to grant allocator 49.

[00080] Downstream data interface is operable to receive data to be downstream transmitted to NUs over a passive optical network and to provide said data to downstream transmitter 46′. Downstream transmitter 46′ is operable to further receive data grants and grouping information request grants from grant allocator [[48]] 49 and to generate downstream frames.

[00083] Grant queues GQI - GQ4 40 - 46 are coupled to grant allocator 49 which selectively fetches issued data grants according to a predefined order, and sends a sequence of data grants to downstream ~~transmitted~~ transmitter 46′, where the data grants are assembled in to a downstream frame. For example, the selection may start by selecting a issued data grants of the highest class of service, and continue to the lower priority class of service grant queues, as long as additional ~~timslots~~ timeslots may be allocated. It is noted that when implementing a fixed timeslot allocation, such as in the case of type 1 T-CONTs, an additional unit (not shown) may be operable to generate data grants to allows a fixed timeslot allocation.

[00095] Referring to figure 3[[A]]B illustrating downstream frames 120 - 140, in accordance to embodiments of the invention.

[00096] The upper part of Figure 3[[A]]B illustrates three downstream frames, such as T-frames, that are transmitted during a single MAC cycle. Each T-frame out of T-frames 120, 130 and 140 includes fifty-three slots.